

**Amendments to the Specification:**

Please replace the TITLE with the following amended title:

-- COMPOSITE FIREARM BARREL MANUFACTURING METHODS AND  
BARREL ASSEMBLIES --

Please replace paragraph [0001] with the following amended paragraph:

[0001] This application is a divisional application under 35 U.S.C. § 121 and claims the benefit under 35 U.S.C. § 120 of U.S. Patent Application No. 10/329,113, filed December 23, 2002, which is a divisional of U.S. Patent Application No. 09/312,205, filed May 14, 1999.

Please replace paragraph [0008] with the following amended paragraph:

[0008] The various aspects of the present invention have one ~~[[of]]~~ or more of the following advantages. The use of the sleeve surrounding the metal insert member protects the metal insert member during manufacture of the firearm barrel. Thus, where the firearm barrel is manufactured using an injection molding process, the sleeve protects against deformation of the metal insert member caused by the heat and pressure of the injection molding process. The sleeve thus results in a firearm barrel with enhanced shooting accuracy. In addition, the firearm barrel is simple and easy to manufacture

After paragraph [0012], please add the following new paragraph:

[0012.1] FIG. 4 is a schematic diagram depicting steps in a method of making the firearm barrel of FIGS. 1-3.

Please replace paragraph [0014] with the following amended paragraph:

[0014] Referring now particularly to FIG. 3, the firearm barrel 14 includes a ~~breech 18~~ breech portion 18 having a reduced diameter section 20 which is adapted

to be received by a sleeve of a rifle chamber (not shown). The section 20 has a cut-out portion or notch (not shown) for receiving an extractor slot held in the rifle chamber. The ~~breech-18~~ breech portion 18 also has a center section 22 having a barrel notch 24 formed in a portion thereof. The barrel notch 24 allows attachment of the barrel 14 to the receiver 16 in any conventional fashion. For example, a wedge (not shown) may be used which fits in the notch 24 to secure the barrel 14 to the receiver 16 using screws or bolts which pass through the wedge. Other examples are shown in Chestnut et al. U.S. Patent No. 4,769,938, which is incorporated by reference. Alternatively, the barrel 14 may be attached to a firearm in any other conventional fashion, such as by means of threads at the end of the barrel 14. The ~~breech-18~~ breech portion 18 additionally has a stem 26 formed at the other end of the ~~breech-18~~ breech portion 18. The stem 26 is formed with serrations, or the like, 28, which extend outwardly from the surface of the stem 26. The ~~breech-18~~ breech portion 18 is preferably an integral piece and, therefore, the reduced diameter section 20, the center section 22, and the stem 26 are integrally formed together from a stiff, heat-resistant material, preferably stainless steel.

Please replace paragraph [0015] with the following amended paragraph:

[0015] The firearm barrel 14 also has a ~~muzzle-30~~ muzzle portion 30. Like the ~~breech-18~~ breech portion 18, the ~~muzzle-30~~ muzzle portion 30 has a stem 32 formed with serrations, or the like, 34, which extend outwardly from the surface of the stem 32 as shown in FIG. 3. Preferably, the ~~muzzle-30~~ muzzle portion 30 is made of a stiff, heat-resistant material, preferably stainless steel.

Please replace paragraph [0016] with the following amended paragraph:

[0016] The barrel 14 also includes an elongated metal insert member 36 which is received by bores formed in the ~~breech-18~~ breech portion 18 and the ~~muzzle-30~~ muzzle portion 30 as shown in FIG. 3. The metal insert member 36 preferably is substantially greater in length than the ~~breech-18~~ breech portion 18 and extends, preferably, for the entire length of the barrel 14. The metal insert member 36 preferably has a relatively thin wall so as to reduce the weight of the firearm barrel

14. The metal insert member is preferably rifled, and is most preferably a rifled liner.

Please replace paragraph [0017] with the following amended paragraph:

[0017] Surrounding the metal insert member 36 is a sleeve 38 as shown in FIGS. 2 and 3. The sleeve 38 surrounds the insert member 36 along at least a majority of the length of the insert member 36. The sleeve 38 is rigid, and, more preferably, is a heat-resistant material that can withstand the heat and pressure generated during an injection molding process. Preferably, the sleeve 38 is formed of a material such as aluminum, steel, carbon fiber or a strong polymeric material. The sleeve 38 is secured to the insert member 36 to prevent the insert member 36 from being blown out of the barrel 14 when shooting, and to enhance the shooting accuracy of the barrel 14 by eliminating any play between loose components. The sleeve 38 is preferably secured to the insert member 36 as follows. The inside bore of the sleeve 38 is reamed to have an inside diameter that is slightly larger, by about 0.003 inch, than the outside diameter of the insert member 36. The interior of the bore of the sleeve 38 is brushed with an adhesive, such as PLEXUS™ MA300 adhesive, sold by 3M Company. The insert member 36 is then inserted into the sleeve 38. Similarly, the insert member 36 and sleeve 38 are adhered to the ~~breech 18~~ breech portion 18 and the ~~muzzle 30~~ muzzle portion 30. Alternatively, the insert member 36 may be connected to the ~~breech 18~~ breech portion 18 and ~~muzzle 30~~ muzzle portion 30 by press fitting, by the use of threads, or other conventional mechanical fastening methods. The ~~breech 18~~ breech portion 18 has an interior bore within the stem 26 capable of receiving the sleeve 38, so that the sleeve 38 is inserted within a portion of the ~~breech 18~~ breech portion 18 and adhered to the ~~breech 18~~ breech portion 18. This has the advantage of providing additional reinforcement to the insert member 36 by eliminating a shear point between the ~~breech 18~~ breech portion 18 and sleeve 38. Similarly, the muzzle may also have an interior bore within the stem 32 to accommodate the sleeve 38.

Please replace paragraph [0018] with the following amended paragraph:

[0018] After the insert member 36, sleeve 38, ~~breech 18~~ breech portion 18 and ~~muzzle 30~~ muzzle portion 30 have been secured together, a casing 40 of a moldable material 42 (FIG. 4) is injection molded around at least part of the sleeve 38, preferably a majority of the sleeve 38, and, more preferably, surrounding the entire sleeve 38, as shown in FIGS. 2 and 3. The casing 40 is made of a lightweight material that is less dense than traditional metals used in the manufacture of firearm barrels. The casing may be a thermoplastic copolymer. Preferably, the casing 40 is made of a blend of polymers and carbon fibers which results in a low shrink rate. In one preferred embodiment, the casing 40 is comprised of a glass reinforced polymeric material sold by Modified Plastics under the trade name UT1018 Makroblend. ~~The breech 18~~ As depicted in FIG. 4, the breech portion 18, insert member 36, sleeve 38 and muzzle 30 are supported in injection molding ~~equipment~~ equipment 44 that permits the injection molding of the casing 40 to a desired diameter around at least portions of the sleeve 38. The optional serrations 28 and 34 assist in maintaining a tight connection between the casing 40, the ~~breech 18~~ breech portion 18 and the ~~muzzle 30~~ muzzle portion 30.